

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

**TREE/SHRUB ESTABLISHMENT
(Acre)
CODE 612**

DEFINITION

Establishing woody plants by planting seedlings or cuttings, direct seeding, or natural regeneration.

PURPOSES

To establish woody plants for:

- forest products
- Provide erosion control
- Enhance energy conservation
- Reduce air pollution by uptake of soil and water borne chemicals and nutrients
- Beautify an area
- Protect a watershed
- Provide wildlife habitat
- Treat waste
- Sequester carbon
- Increase species diversity

CONDITIONS WHERE PRACTICE APPLIES

On any areas where woody plants can be grown.

General Criteria Applicable to All Purposes

Species selected will be adapted to soil-site conditions and be suitable for the planned purpose(s).

Planting and/or seeding rates will be adequate to accomplish the planned purpose(s).

Planting dates, and care in handling and planting of the seed, cuttings, or seedlings will ensure that planted materials have an acceptable rate of survival.

Only viable, high quality and adapted planting stock or seed will be used.

Site preparation shall be sufficient for establishment and growth of selected species.

Adequate seed or advanced reproduction needs to be present or provided for when using natural regeneration to establish a stand.

Timing and use of equipment will be appropriate for the site and soil conditions.

The acceptability and timing of coppice regeneration shall be based on species, age, and diameter.

The planting will be protected from unacceptable adverse impacts from pests, wildlife, livestock, vandalism, humans, or fire.

Each site will be evaluated to determine if mulching, supplemental water or other cultural treatments will be needed to assure adequate survival and growth.

Only viable, high-quality and adapted planting stock or seed will be used.

Additional Criteria for Improving or Restoring Natural Diversity

Species selected will be indigenous to the site and will reflect species composition of the desired stands.

CONSIDERATIONS

When underplanting, trees should be planted sufficiently in advance of overstory removal to ensure full establishment.

Use locally adapted seed, seedlings or cuttings. Priority will be given to plant materials that have been selected and tested in tree/shrub improvement programs. All plant materials should comply with a minimum standard, such as the American Nursery and Landscape Association, Forest Service, or state-approved nursery.

Prescribed burning may be required for natural regeneration of serotinous cone species and for site preparation for other species.

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Plans for landscape and beautification plantings should consider foliage color, color and season of flowering, canopy cover density, and mature plant height. Additionally, consider habitat benefits, rooting characteristics and maintenance needs.

Where multiple species are available to accomplish the establishment objective(s), consideration should be given to selecting the species which best meet wildlife needs.

Tree/shrub arrangement and spacing should allow for and anticipate the need for future access lanes for management purposes.

Residual chemical carryover from previous activities should be considered prior to planting.

Species considered locally invasive or noxious should not be used.

Species used to treat waste should have fast growth characteristics, extensive root systems, capable of high nutrient uptake, and may produce wood/fiber products in short rotations.

For optimal carbon storage, select plant species that are adapted to the site to assure strong health and vigor and plant the full stocking rate for the site.

Planning

Use plants grown from seed from same seed zone in which the planting is to be done.

Planting can be done either by machine or by hand. Machine planting will be limited by small areas, steep topography, windfalls, rock outcrop and heavy brush or slash accumulation. Hand planting is adaptable to all areas. Any equipment that can create a suitable planting cavity can be used, e.g., shovel, auger, planting bar.

The location for each planted seedling should take advantage of every moisture conserving and heat-protecting factor available, such as: shade provided from stumps, logs, surface rocks, clods, hummocks, etc.

When selecting species, consideration should be given to esthetic values for recreation areas and borders along through fares or any other public access sites or view scapes.

Tree stock can generally be 1-0, if it is over 8" and vigorous. However, the harsher the site the more important for 2-0, 2-1, 1-2 stock.

Temporary or permanent irrigation may be necessary on some areas and for some species.

When irrigation is planned, have the systems in place prior to planting. To increase survival, irrigate after planting to aid in packing the soil around the seed or roots and assure enough water to begin growth.

Rooting hormones and fertilizers have not significantly improved success compared to the cost of the materials.

All sites and all plant species may be subject to unacceptable damages due to browsing, grazing, vandalism or other human impacts. Protection may be required to hold damages to an acceptable level. Planning will include preparing estimates of the occurrence of animal populations, which have the potential of causing damage. Use of sightings of gopher mounds, animal trails, beaver activity, frequency of scat, and evidence of browsing on native plants will yield data that can help determine the need for plant protection. In urban areas use of signs and/or barriers may be required to reduce damage to an acceptable level.

Additional Criteria For:

Pole Plantings/cuttings:

When used in highly erodible areas some method of protection should be placed in front of the pole plantings/cuttings. The toe can be very susceptible to erosive flows and scour. If rock is used to stabilize the area careful application is required. Improperly placed rock can result in erosion problems on the opposite bank and downstream.

Give careful attention to both the upstream and downstream ends of the treatment area to ensure flows do not get behind the treatment. Try to divert flows away from the endpoints by tying into existing features such as trees, rocks, etc. or consider utilizing brush or other suitable revetments.

Forest land:

Planting Dates:

Sierra Nevada: Planting should be made as early in the spring as possible or when soil moisture conditions are sufficient. On the west side, planting can start the last of January or the first of March. On the east side, it will be later; and at high elevations, after the snow melts.

Coast Range: December through March

South of the Tehachapi Range: March to late April

Siskiyou: February to April

Trees per Acre:

Coast Redwood Region: 300 trees per acre-

Remainder of California: 436 to 681 trees per acre.

Other Plantings:

Species: Species selection and spacing information is contained in the respective MLRA Vegetative Guide in the Field Office Technical Guide.

Direct Seeding:

All direct seeding of conifers and hardwoods will be by spot seeding. Direct seeding of forestland coniferous and deciduous species will require the review and approval of a NRCS forester.

Softwood Seeding:

Seeding Rates:

Rates Of Pure Live Seed shall be as shown.

<u>Species</u>	<u>seeds/spot</u>
ponderosa pine	4 to 8
Jeffrey pine	4 to 8
True Firs	10 to 15
red fir	
Shasta red fir	
white fir	
Coastal Douglas-fir	4 to 8
Inland Douglas-fir	8 to 10

Timing of Seeding:

Just before or right after the first precipitation of the season.

Protective Measures:

Prior to the initiation of seeding the area to be seeded will be evaluated for the potential of seed predation. If the evaluation indicates predation will significantly impact the success of the seeding, the seeding should be postponed until techniques are utilized to decrease predation.

Hardwood Seeding:

Blue Oak

Blue oak will not be recommended for seeding if the soils are less than 20 inches deep, has more than 35 percent clay or a hardpan within 20 inches of the surface, has an average annual rainfall of less than 16 inches, is not present, or has not been historically present in the vicinity of the proposed seeding.

Soils may contain any amount of coarse fragments and should have a high base saturation.

California Black Oak

California black oak will not be recommended for seeding where the soils have a restrictive layer within 40 inches of the surface, are not well drained, the clay content exceeds 35 percent, are compacted, on soils originating from serpentine, or where the average annual precipitation is less than 20 inches. They will do well on medium to coarse textured, deep and well-drained soils.

Do not seed where California black oak is not present or has not been historically present in the vicinity of the proposed seeding.

Canyon Live Oak

Canyon live oak may be recommended for seeding on soils derived from sedimentary, metasedimentary, granitic, serpentine, and perodite parent materials. It may be seeded in soils with a depth of 12 inches or greater and the average annual precipitation must exceed 12 inches. Canyon live oak must be present or have been historically present in the vicinity of the proposed seeding.

Oregon White Oak

Oregon white oak may be recommended for seeding on moderately deep soils of varied parent material, including serpentine. It may also be seeded on flood plains in heavy clay soils and where there is standing water or a shallow water table during a lengthy wet season. Do not seed where it is not present or has not been historically present in the vicinity of the proposed seeding.

Valley Oak

Valley oak will not be recommended for seeding if the soil is less than 60 inches deep, has an average annual rainfall less than 12 inches, valley oak is not present or have not been historically present in the vicinity of the proposed seeding. Additionally, they will not be seeded when the elevation exceeds 5000 feet in the Coast Range and Southern California, and where the elevation exceeds 2000 feet in northern and central California.

Irrigation is not required for the establishment of valley oak. However, if irrigation is utilized the water applied must be sufficient to wet the soil profile to the depth of the water table or twelve feet, whichever is least restrictive.

Seeding Dates

Acorns will be planted in the fall after the first major rains. The soil profile will have moisture to a depth of at least 2 feet. If there are no major rains they will be planted by the end of December.

Seeding Rates

Acorns may be planted individually or in multiples at each planting site. For acorns to be planted individually the minimum percent acorn germination rate must exceed 95 percent.

Plant acorns on their side a minimum of one inch deep and not more than 2 inches deep. If multiple acorns are planted at a single site they must be a minimum of 4 inches apart.

Protective Measures

Control of Competing Vegetation.

Control of competing vegetation will be accomplished within a 3-foot diameter at a minimum. A 5 to 6 foot diameter area of controlling competing vegetation is preferred. Plant competition may be removed by hand, mechanical or chemical means.^{1/} Mulches (See Practice 484 - Mulching) may be applied to the planting site to control competing vegetation and conserve moisture.

Predation Control

In areas where ground squirrel and/or gopher activity may impact germination and survival, acorns may be enclosed in wire mesh cylinders or baskets (0.5 to 1.0 inch mesh) buried at least 12 inches in the soil and extending at least 12 inches above the ground.

Where rabbits, deer, elk cattle etc., are expected to pose a hazard above ground protective devices of chicken wire, rigid polypropylene, either mesh or twin walled, will be utilized to protect the emerging oak and first year seedling. Individual protective devices at least 4 feet high will be required to provide protection until the seedlings reach a point where the growing point is not readily browsed. Control may be by a number protective devices including Chicken wire tree protection, Rigid polypropylene - mesh tube tree protection, and Rigid polypropylene - twin walled extrusion. Colors may range from white (low light conditions) to brown. Where cavity nesting birds or other wildlife entering the tubes may be a problem the tops of the tubes will be covered with a mesh sleeve to prevent entry.

Water Quantity

The purpose of this practice is to establish or reinforce a stand of trees to conserve soil and moisture, beautify an area, protect a watershed, or produce wood crops. On a short-term basis, 2 to 24 months, this practice will

^{1/} Chemical application recommendations and application rates will be made by a licensed applicator, farm advisor, or others licensed to do so in California.

have a negligible effect on the quantity of surface or ground water. As the stand becomes established and the trees have rerooted, they will take up more and more soil water during their growth cycle.

The long-term effect will be a reduced runoff from the area, a greater amount of surface storage in the forest duff and more infiltration, without a great increase in the amount of water that percolates below the root zone. The actual conditions which may result from the application of this practice must be on the species planted, the spacing of the planting, the soil and topographic conditions that exist on the specific site.

Water Quality

As the stand becomes established, there should be a decrease in the surface runoff, with an accompanying decrease in the erosion. This will reduce the sediment yield from the site, as well as reducing the sediment-attached materials, which may enter the receiving waters. Reduced quantities of water percolating below the root zone will reduce the potential for the transport of dissolved materials into the ground water.

Endangered Species Considerations

Determine if installation of this practice with any others proposed will have any effect on any federal or state listed Rare, Threatened or Endangered species or their habitat. NRCS' objective is to benefit these species and others of concern or at least not have any adverse effect on a listed species.

If the Environmental Evaluation indicates the action may adversely affect a listed species or result in adverse modification of habitat of listed species which has been determined to be critical habitat, NRCS will advise the land user of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the landowner selects one of the alternative conservation treatments for installation; or at the request of the landowners, NRCS may initiate consultation with the Fish and Wildlife Service, National Marine Fisheries Service and/or California Department of Fish and Game. If the Environmental Evaluation indicates the action will not affect a listed species or result in adverse modification of critical habitat, consultation generally will not apply and usually would not be initiated. Document any special considerations for endangered species in the Practice Requirements Worksheet.

Some species are year-round residents in some streams, such as, freshwater shrimp. Other species, such as steelhead and salmon, utilize streams during various seasons. Be aware those critical periods, such as spawning, eggs in gravels, and rearing of young may preclude activities in the stream that may directly affect the stream habitat during those periods. For example there should be no disturbance of stream gravel beds that may have eggs in them. That could include any equipment in the stream or even walking in the stream or work upstream that may result in sediment depositing in the gravel beds. Document any special considerations for endangered species in the Practice Requirements Worksheet.

Cultural Resources Considerations

Determine if installation of this practice with any others proposed will have any effect on any cultural resources. NRCS' objective is to avoid any effect to cultural resources and protect them in their original location. GM 420, Part 401, the California Environmental Handbook and the training for the California Environmental Assessment Worksheet specify how the NRCS must account for cultural resources. The Field Office Technical Guide, Section II contains general information, with Web sites for additional information, about cultural resources. The Environmental Handbook is online at www.ca.nrcs.usda.gov/rts/rts.html.

PLANS AND SPECIFICATIONS

Specifications for applying this practice shall be prepared for each site and recorded using approved specification sheets, job sheets, and narrative statements in the conservation plan, or other acceptable documentation.

Adapted tree and shrub species for the purposes outlined, spacing, planting methods, cultural practices and maintenance requirements that are applicable; and variations in methods and species between interplanting, underplanting, and planting in open areas. Separate specifications can be prepared for each of these planting methods.

Specification Guide

Species selection and spacing shall be in conformance with the respective MLRA Vegetative Guide in the Field Office Technical Guide.

Based on limited observations, the following species normally require protection to control damage due to browsing or grazing:

fourwing saltbushlilac
golden willow native plum
skunkbush sumac green ash
Douglas-fir mulberry
ponderosa pine aspen
Afghanistan pine dogwood
poplar spp. birch spp.
Arizona cypress white fir
willow spp. redwood
oaks

OPERATION AND MAINTENANCE

At least annually, the area will be inspected to identify 'spots' where additional treatment is necessary. Replanting will be required when survival is inadequate.

Replace all dead seedlings annually for at least two years after the initial planting is made.

Replanting will be conducted during the same year, unless the time has passed for proper treatment.

Competing vegetation will be controlled by any acceptable method until the woody plants are established.

Plant competition can be removed by hand, mechanical, or chemical means. Do not disturb or otherwise damage seedlings by the improper use of chemicals, tools or machinery. When mechanical cultivation is used, do not cultivate deeper than 3 inches within 24 inches of the seedling.

Noxious weeds will be controlled.

Trees and shrubs will be protected from fire, insects, disease, vandalism and animals until established.

Supplemental irrigation may be desirable to ensure adequate survival.

Damaging pests will be monitored and controlled. Animal, rodent, disease, and insects should be controlled by rodent guards, fencing, trapping, general cleanup or the use of approved chemicals.

Periodic applications of nutrients may be needed to maintain plant vigor.

Use of mulches may aid in controlling weeds, and aid in moisture conservation.

Exclude livestock and poultry from plantings.